IV. Application

A. Wind Duration vs. Wave Height

- If you have done the Forecasting activity, skip the boxed wind barb section below.

- Go to the University of Illinois at Urbana-Champaign WW2010 Project Wind Barb site below.
http://ww2010.atmos.uiuc.edu/guides/maps/sfcobs/wnd.rxml

- Read pages 1 through 3. Once you understand how wind barbs work, click "Back" until you get back to the OAR Great Lakes site and continue with this activity.

- Click on the "All Lakes Wind" site.
- If you have a color printer, print the map using the "Best" quality.
- A grayscale printer will not provide a useable image.

1. Describe both the direction of wind and the speed of wind on Lake Michigan. What is the overall pattern of wind speed and direction on the lake?

_____

_____

_____

_____

2. Describe the wind speed in different locations on Lake Michigan.

_____

_____

_____

_____

- Click "Back" until you get back to the OAR Great Lakes Application site.
- Click on the "All Lakes Wave Height" site.
- If you have a color printer, print the map using the "Best" quality.
- A grayscale printer will not provide a usable image.
- If you don't have a color printer, enter the following URL. ftp://superior.eng.ohio-state.edu/pub/ncaster/allakes/97/w9711212.gif
- Click the "Back" and "Forward" buttons on the web browser to move between the pictures if you want to.

3. Describe the wave height in different parts of Lake Michigan. What is the overall pattern of wave height?

_____

_____

_____

4. What is the relationship between the length of time the wind blows over water and the height of the waves produced?

_____

_____

_____

- Click "Back" until you get back to the OAR Great Lakes Application site.

B. Economic Impacts

1. Think about the harmful and beneficial effects of Zebra mussels. What are some ways Zebra mussels are economically important?

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_____

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_____

- Click "Forward" at the bottom of the screen.

C. Progress

The Great Lakes border not only the US, but also Canada. The water quality of the lakes affects both countries. We have to work together to provide a future for the lakes and the people who live on them. Both countries signed an agreement called "The Great Lakes Water Quality Agreement" that has helped us clean up the lakes. The Canadians have designed a site called the Great Lakes Atlas that has lots of useful and interesting information on the lakes. You can find the URL in the Related Web Sites section at the end of the activity. This section uses parts of their Great Lakes Information Management Resource site.

- Click on the "State of the Lakes" site.

1. Overall, which lake had the highest concentration of phosphorus in 1991/92?

_____

2. Which lake had the highest concentration of PCB's in fish?

   Lake _____ had a PCB concentration of _____ ppm.

3. Which lake had the highest concentration of PCB's in gull eggs?

   Lake _____ had a PCB concentration of _____ ppm.

4. Which lake had the second highest concentration of PCB's in gull eggs?

   Lake _____ had a PCB concentration of _____ ppm.

5. Compare the small inset map in the upper right corner to the larger map. Which areas show the greatest improvement between 1983 and 1991?

   _____

6. What does the graph of the PCB concentration at Mugg's Island show is happening over time?

   _____

7. What do you think caused the trend in question 4 above?

   _____

   _____

- Click "Back" until you get back to the OAR Great Lakes Application site.

- Click “Forward” at the bottom of the screen.

D. Long-Term Recovery

- Click on the "Great Lakes' Future" site.
- Read from "The Future of the Great Lakes" section to the bottom of the site.

1. What can we do to ensure the recovery of the Great Lakes' ecosystems?

_____

_____

2. How can we use maps of populations to help understand the living resources in the Great Lakes?

_____

_____

_____

- Click "Back" until you get back to the OAR Great Lakes main screen.

- Click “Enrichment”.

V. Enrichment Activities

A. Interviews

1. Interview a meteorologist about the specific weather conditions that are caused by the Great Lakes, especially in winter.

2. Talk with someone who has gone ice fishing and ask about what is caught, when is the best time to go, and what is used for bait.

B. Newspaper Activities

1. Using the weather section or map, keep a record of the daily temperatures or snowfall at cities around the Great Lakes vs. cities inland. What is the difference between inland and coastal cities' temperatures and rainfall?

2. Collect news articles related to the health of the Great Lakes and summarize each article.

C. Research

1. Write a short report on how the Great Lakes formed. Include when they were formed, how they were formed, how long it took, and a diagram of what happened.

2. Find out who was the first European to see the Great Lakes.

3. Using a map, list all the major cities and their populations that border the Great Lakes. Add the total population of the cities.

4. Research Native American tribes that lived in the Great Lakes area.

5. Find out what industries are supported by the Great Lakes.

6. Find out why Chicago is called "The Windy City".

7. Research diatoms and find out what they are used for.

- Click "Forward" at the bottom of the screen.

D. Related Web Sites

1. Great Lakes' Effects on Weather
   http://covis.atmos.uiuc.edu/guide/rsteve/html/snglband.html
2. Great Lakes Environmental Research Laboratories
   http://www.glerl.noaa.gov
3. Great Lakes Atlas - Tons of info and great pictures
   http://www.cciw.ca/glimr/data/great-lakes-atlas/intro.html
4. Great Lakes Phosphorus and PCB concentrations map
   http://www.cciw.ca/glimr/data/great-lakes-atlas/images/gig13.gif
5. Native American tribal information
   http://cciw.ca/glimr/data/great-lakes-atlas/glat-chap3.html#1
6. Exotic Species in the Great Lakes Regions
   http://great-lakes.net/envt/exotic/exotic.html
7. Amphipod Decline Page (435K PDF file)
   http://glerl.noaa.gov/pubs/brochures/dipo.pdf